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SEPTIC GENERAL PERITONITIS IN CHILDREN

PRACTICAL POINTS IN ITS SURGERY AND SUCCESSFUL AFTER-TREATMENT

BY

F. W. FORBES ROSS, M.D. Edin.,
F.R.C.S. Eng., D.P.H. Lond.
LATE CIVIL SURGEON, HIS MAJESTY'S GUARDS' HOSPITAL, LONDON

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COLLEGE OF SURGEONS OF ENGLAND

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SEPTIC GENERAL PERITONITIS IN CHILDREN.

PRACTICAL POINTS IN ITS SURGERY AND SUCCESSFUL AFTER-TREATMENT.

Septic general peritonitis in young children has unfortunately a very heavy mortality, and, as the operative treatment thereof holds out the only hope of saving life, it necessarily follows that the surgical "mortality" can only refer to those cases which die after attempts at rescue by surgical methods, and not to the invariable death which overtakes the "unoperated" cases. As young children stand laparotomy very badly, apart from so serious a condition as acute general peritonitis, and if therefore the two in conjunction are to be successfully encountered, it behoves us to avail ourselves of every possible procedure or routine which gives the maximum of safety and efficiency with the minimum of reactionary surgical traumatism.

Almost the only source of acute septic general peritonitis in young children (up to the age of ten years), apart from traumatism or perforation of bowel in enterica, is appendicitis, either gangrenous and fulminating, or the bursting of a peri-appendicular abscess into the general peritoneal cavity.

"Do as little as possible, and do that gently, quickly, and neatly," is nowhere so applicable as to any surgical attempt to rescue a little child who is the victim of acute septic general peritonitis. It is hoped that the few practical suggestions given below will, or may, prove helpful to those suddenly called upon to deal with the condition where that expert skill which "never loses a single case" is unobtainable, and where text-books furnish scant information of clinical detail in treatment.

ILLUSTRATIVE CASE.

The following case, which had completely recovered within three weeks of operative procedure, will serve to illustrate the clinical bearings of this communication, and bring out helpful details in successful operative and after-treatment :—P— E—, aged five years, was seen by the writer, at the request of his medical attendant, on Tuesday, September 12th, 1911. His illness dated from the previous Saturday night, September 9th. Off and on during the previous eighteen months he had complained of "stomach ache," and had had frequent attacks of "night-terrors," awakening and complaining of abdominal pain. From the 9th till the 12th ult. his illness consisted of the usual abdominal symptoms, pain and tenderness in the right illiac fossa, malaise, slightly foul tongue, thirst, constipation, temperature 100°–101° F., pulse 100–105.

When seen by his usual medical attendant on the morning of the 12th ult. his temperature was 99·4° F., his tongue was coated white (no signs of small dry brown tongue), his pulse was running 140 and increasing. He had complained previously, and then, of pain *along the middle line of the hypogastrium between the umbilicus and the pubes and nowhere else.* I saw him early in the afternoon of the same day, when he repeatedly indicated with his hand the same localization of his "tummy ache." The abdomen was rigid and tympanitic, the liver dulness was masked, his temperature was 100° F., his pulse was 143 and variable, and he lay upon his back with his legs drawn up.

The diagnosis of rupture of an acute appendicular abscess into the general peritoneal cavity was made and operation advised. Consent having been gained late that evening, and although the case seemed a fairly hopeless one, it was decided to try and save him. Dr. P. H. Parsons administered an anæsthetic, and I opened his abdomen by the "gridiron" method (separation of the muscular fibres parallel to their direction). The peritoneal cavity was found to be full of milky pus, with here and there localized collections of dark brown grumous pus with a horrible fæcal odour. With the utmost gentleness the gloved forefinger was moved along the ascending colon on its inner and outer aspect, with the deliberate intention of completely breaking down any isolated loculus of pus. During this manœuvre a large collection of fæcal pus was found on the inner side of the ascending colon amongst the coils of small intestine, and was evacuated through the wound. There was no mesocolon, and the surrounding tissues were much thickened, and rigidly bound the colon deep down in the illiac fossa; it could not therefore be brought up into the wound, much less out of the abdomen.

The appendix was discovered hanging over the brim of the pelvis and was adherent by its tip deep down between the bladder and rectum, where also was a collection of pus. The appendix was inserted on the inner posterior aspect of the bound-down cæcum, and was with difficulty removed. It was grasped near its insertion by artery forceps, and crushed, its rigid mesentery was ligatured and divided; it was then ligatured and cut off distal to the crushing forceps, and the site gently touched by a sterile swab. Whilst holding the stump by the still-crushing forceps, a purse-string suture of silk was passed round it in the cæcal wall, the point of the forceps depressed and the purse-string pulled, thus rapidly burying the stump, and without too much manipulation. The forceps were now slipped out, and two or three mattress sutures passed. The entire procedure was necessarily done deep within the abdomen through a two and half inch wound, as none of the structures could be withdrawn therefrom. Four inches of half-inch drainage tube was inserted down into Douglas' pouch, and another of the same length up into the abdomen on the inner side of the ascending colon.

Absolutely no attempt was made to either flush out, or even swab out, the peritoneal cavity in any way; no peritoneal toilet or semblance thereof was thought of or attempted. The abdomen was rapidly closed round the tubes in a manner to be described, and the child returned to bed with an improved pulse of 125.

He was ordered to have from six to ten ounces of saline per rectum every two hours all night.

Firmly believing that the successful after-treatment of all cases of acute general peritonitis depends on not allowing either adults or children to lie flat on their backs for at least twelve hours after operation, he was only permitted to recline in a semi-erect, semi-prone, posture on pillows on his right side; and to maintain him in this position, his left hand was drawn up across his head and shackled to the right corner of the bed head; his left leg was drawn over to the right across a pillow, and fixed by a bandage to the right edge of the bed. The nurse had instructions never to permit him for an instant to turn on to his back. This semi-prone attitude in children tends to promote instant and rapid drainage of all pathological products, and facilitates the administration of the vitally necessary salines, as also to prevent toxic absorption by way of the diaphragm and upper peritoneal reaches. At 9 a.m. the next morning, as his pulse was somewhat irregular in force and still 125–130, he was given a single teaspoonful of brandy in a saline enema. He was now allowed to recline in the supine position. Two and a half minims each of tincture of digitalis and strophanthus, with half a grain of carbonate of ammonia, was now given every three hours, and by 5 o'clock that afternoon his pulse was only 100, regular and stronger. The following day, 14th ult., the boy was apparently quite well, and made an uneventful and rapid recovery, the wound healing well, until the 22nd ult., when a not uncommon but easily treated complication supervened.

His temperature suddenly rose to 102·6° F., and his pulse to 110, with the complaint of abdominal pain. His daily history showed that his bowels had acted regularly. An enema was now ordered, with very slight result. Experience shows that these cases are particularly prone to fæcal accumulation in the rectum and lower colon in spite of the apparent daily action of the bowels, with or without enemata. A well-oiled finger was passed into his rectum, and some hard fæcal nodules removed therefrom; this was at once followed by a very copious stool of mixed scybala and semi-solid fæces to the amount of half a pint. The foregoing is mentioned, as it has an important connection in these cases with a hitherto unrecognized condition of the lower bowel, which can be briefly described as an effusion-bound paralysis of the rectum due to the retraction and fixation of its walls by the contraction of the surrounding inflammatory effusion, dragging them apart in every direction and ballooning the lumen of the rectum so as to render its normal expulsive action on its contents almost if not quite abortive.

The free gut higher up between the rectum and sigmoid colon undergoes tonic contraction, and acts then as a sphincter between the sigmoid and rectum and causes accummulation in the sigmoid and descending colon. The same condition also causes a strong reflex contracture of the sphincter ani (tonic), and owing to the great weakness of the patient's abdominal muscles, due to the recent illness, unassisted complete daily evacuation of the bowels is impeded, and so a gradual stagnation results in an apparent abdominal relapse, soon remedied if the cause be known.

I have seen this condition repeatedly in children recovering from mild appendicitis without operation. It is as well to bear in mind this condition of the rectum in children, especially if after a quite uneventful convalescence from appendicitis (with or without laparotomy), accompanied by much peritoneal reaction, there should occur a rise of temperature and pulse with abdominal pain. One is tempted to think of recrudescence, or undrained and overlooked collections of pus in the abdomen, or a pericæcal abscess, the result of suppuration of ligatures in the bowel wall. Much worry and anxiety is saved if the aforementioned post-peritonitic ballooning of the rectum is borne in mind, and a finger passed into the anus.

At the present time the little patient, whose case serves to illustrate this communication, is now quite well and in very excellent health.

GENERAL REMARKS.

One now asks space and patience of the reader to emphasize and discuss, as briefly as possible, facts that can be usefully deduced and learned from the foregoing case.

The success of the after-treatment of cases of acute septic general peritonitis amongst children, even more so than amongst adults, depends very closely on just what is done or attempted at the time of operation. It is as well to remember that some omissions at the time of operation cannot be easily remedied afterwards, and that over zeal during operation is perhaps a more potent cause of post-operative fatality that the disease factors. Bearing these points in mind, we can now usefully review the situation from an operative and clinical point of view.

I would call attention to the vague pains in the abdomen during the previous eighteen months, and the "night-terrors," with abdominal discomfort, because this boy's appendix when removed was found to contain a fæcal concretion, which had caused the appendix to necrose and perforate. There can be no doubt but that appendicular colic was more or less the cause of the "night-terrors" and discomfort.

ABDOMINAL LOCALIZATION.

The next point of interest clinically was his persistent passing of his hand from his umbilicus down the middle line of the hypogastrium when asked to show "where the pain was." Was this due to the abscess along the inner side of the ascending colon? or to the fact that his appendix was stretched out down into the pouch of Douglas, and so involved his lower bowel areas? My own opinion is that it was due to the organs involved, and to the situation of the appendix, because the appendix tends to transfer its pain along the course of the superior mesenteric artery, whereas any affection of the colic peritoneum refers the pain along the colic branches of the same artery and the inferior mesenteric artery. In the first case the (appendicular) corresponding somatic nerves refer the pain to the umbilicus, and in the latter (colon involvement) to the hypogastrium accordingly. Careful observation of acute abdominal conditions tends to firmly establish the following axiom:—"All organs totally covered by peritoneum refer their pain back along the sympathetic arterial plexuses of their nerve supply and so to the corresponding somatic nerves distributed to the skin of the abdomen; all organs partially covered by peritoneum refer their pain to the body wall over their situation." The length of time therefore that the pain of appendicitis will remain confined to McBurney's area is in direct ratio to the presence of a long, short, or absent mesocæcum or ascending mesocolon, the time being shortest in the first case and longest and most permanently in the last.

Reference to the umbilicus also rapidly follows any spread of reaction involving small intestine for reasons already given. So that a long mesocæcum and mesocolon with reaction amongst coils of small intestine will lead to early reference to the umbilicus, whereas absence of a mesocæcum and mesocolon and non-reaction amongst small intestine will delay reference to the umbilicus or entirely confine reference of pain to McBurney's area only. The significance of the foregoing is that *one cannot rely on reference of the pain as an index of severity of the disease, but can rely on reference most certainly as to locality and parts involved.* This is important, for if the operator knows and understands his rules of reference of pain on the abdominal wall in these conditions, he can unerringly find and relieve his foci of disease without harmful and often fatal and futile handling of the abdominal contents, one of the most frequent causes of death in children after operation undertaken for general peritonitis.

In the case here described the little patient never indicated the umbilicus until after general peritonitis had set in. At the operation the ascending mesocolon was found to be absent, and the cæcum was sessile in the right illiac fossa, the oldest collections of pus were along the ascending colon and down in the pelvis round the sigmoid colon and rectum, thus proving my deductions from the patient's own pain-reference.

It will be repeatedly noted in the cases of appendicitis in adults, where the diseased appendix is situated on the outside of, and along the ascending colon, that the patient will complain of the pain extending along the flank and round the loin towards the renal region. I have repeatedly noted this sign, and find that the situation of the appendix corresponds with tolerable accuracy, when the cæcum is sessile.

The operative significance of the foregoing is as follows :— In cases where the pain is referred to the skin of the abdomen from the umbilicus downwards to the pubes, it is necessary for the operator, especially in children, to gently explore along both sides of the ascending colon and downwards into the pelvis, because there may either be an isolated loculus of pus in each locality, or there may be pus alone in one situation, and the appendix and pus in the other, as actually happened in the case quoted.

OPERATIVE PROCEDURE.

Whilst conducting an operation for suppurative peritonitis in children, the following gentle exploration by the *gloved* finger should be undertaken, especially if any marked evidence of inflammatory reaction be prevalent :—

(1) Along the inner and outer sides of the ascending colon ;

(2) At the upper and lower angles of junction of the small intestine with the cæcum ;

(3) Round and under the caput cæcum coli ;

(4) Down into the pouch of Douglas.

One of the causes of death in children after operation for suppurative appendicitis, with or without general peritonitis, is undoubtedly the fact that a second or third isolated abscess in one or other of the above situations has been overlooked.

No intestine, large or small, should if possible be pulled out of the abdomen, and the only things that should be put into the abdomen of a child is a gentle *gloved* finger, some silk ligature for the appendicular stump, and the drainage tube—and nothing else absolutely. The only thing that should be taken out of the abdomen is the appendix (if obtainable), and the pus allowed to flow out of *its own accord*. With proper post-operative posture of the patient and free drainage by tube (not gauze) absolutely no fear of doing harm by such gentle exploration as recommended should deter the operator; certainly not that bugbear of "infecting any more peritoneum." Indeed, it pays to admit the serous secretions of the healthier peritoneum, rich in opsonins and anti-bodies, into and over the damaged area, provided that absolutely no flushing, mopping, swabbing, or washing has been attempted or permitted, as these all tend first to wash away our best friend (the serum), and then to injure surfaces by mechanical action and handicap Nature. The bacterial flora of acute general peritonitis following appendicitis are definite in character and the reactions they produce. Paradoxically, if it were only generally recognized that these organisms were themselves relatively harmless apart from their deadly poisonous toxins, and that when these toxins ceased to be under the pressure (which causes their rapid absorption and speedily fatal results), by reason of the surgeon's incision and correctly-applied drainage, peritoneal so-called "toilets" will be classed as surgical crimes (where they are not needed to remove actual fæces or foreign solid matter) where the futile removal of pus is aimed at, for the following reason: Anyone who has ever opened a septic abdomen, and who uses his natural powers of observation, will have noticed the lightning-like rapidity with which (the intra-abdominal pressure being relieved by incision and absorption from the peritoneum stopped) the whole peritoneal surface begins to copiously weep clear serum, and how soon the discharge from the abdomen clears up and becomes sero-sanguinolent, or even quite limpid.

One has had hardly time to complete the removal of an appendix before the peritoneal secretions have most markedly changed in character and appearance. Every square millimetre of peritoneal surface, every stoma, and every cell on the peritoneum is exuding its quota of "biological lavage," pushing away, as it were, and interposing healthy normal opsonic serum and phagocytes between the surface and the pathological fluids and detritus. This copious "serous weeping" tends to create a current towards the most dependent point, and if this is also the point of outlet by reason of the posture of the patient, then the entire peritoneal cavity rapidly renders itself almost aseptic, this satisfactory condition usually supervening within twelve hours of operation. The importance of the post-operative attitude in bed of the patient is now quite apparent.

The above also explains the rationale of the advice that no toilet manipulations of the peritoneum should be attempted, not for the common fear that they serve to further "distribute infectious matter," but solely for the reason that they damage the surfaces and remove valuable aids to *neutralizing*, and then automatically floating away harmful materials, besides increasing shock and diminishing the chances of recovery in children.

The surgeon who scrapes lymph off the intestines is committing a grave error.

One feels convinced that many more young children would survive laparotomy for this intensely septic condition if full reliance were placed on this "natural automatic lavage" of the peritoneum, and all toilet manipulations whatsoever abandoned except where fæces or actual foreign matter were present. If the utmost use must be made of the natural biological lavage of the peritoneum and full benefits accrue, then the importance of the oft-repeated rectal saline injection during the first twenty-four hours after operation is overwhelmingly obvious. Free drainage, after gentle manipulation at operation, with an oft-repeated rectal saline, will drag many a hopeless case amongst children out of the grave.

DRAINAGE.

Another point of surgical interest is the desirability of using drainage tubes of sufficient, but not too large diameter, as experience shows that too large a drainage tube—too much foreign body—tends to keep up the nervous abdominal symptoms in children, and the prompt recognition and removal of drainage tubes too large in diameter is at once followed by improvement. Gauze drains appear to act in the same harmful way; they are inefficient as drains. For this reason they are to be strongly deprecated, they adhere to the surfaces, and cause further injury and denudation of surface when forcibly pulled out as they have to be.

A well-perforated drainage tube, of about the diameter of "half-inch" over all, is ideal for free drainage and rapid healing. The routine of not irrigating the abdominal wound till the third day after operation is to be commended; and this should never be done with a syringe, but by a funnel and fine red-rubber tube dropped gently down the lumen of the drainage tube, which latter, originally about four inches long, can be shortened by half an inch daily. Never, if possible, withdraw a drainage tube to shorten it, and then seek to re-introduce it; this interferes with adhesions, but pull it up gently and cut off the protruding portion. Beware of keeping a drainage tube so long in an abdomen that it creates a rigid cicatricial canal which will close very slowly. It is well to bear in mind that the track of a drainage tube in the abdomen during the first few days after operation is one which is surrounded by pneumatic walls which close in rapidly on any space left by curtailing the tube daily, thus facilitating rapid shortening of the tube and early cessation of its use.

As the micro-organisms present in septic general peritonitis, usually colon bacilli, and the organisms of Shattock and Dudgeon, are just about all that a patient after operation can comfortably and successfully cope with, it behoves us not to introduce any others, and with that object all cases of acute septic general peritonitis should be operated on under the strictest aseptic conditions. The skin of the abdomen should be as carefully prepared, or painted with tincture of iodine, as for an ordinary laparotomy with a healthy peritoneum.* The operator should wear *gloves*, not to protect

* The pus issuing from a so-called septic abdomen is not very virulent from the fact that the wound through the skin and muscles where they are stitched will heal by first intention even though in previous contact with that pus.

his hands from infection by the germs in the abdomen, but to protect the abdomen from the introduction of other, further, and perhaps more deadly germs lurking in the epithelium of the well-washed hands of the operator. If gloves are not available, then immersion of the fingers for a few seconds (after scrubbing the hands) in tincture of iodine, and then in perchloride solution, will render them fit for use. The most suitable medium for irrigating the wound, on the third day after operation (and never before then), is boric solution, or iodine water (one dram of tincture to the pint), the skin being wiped with a swab rung out of perchloride solution, or 1 in 40 carbolic: sterilized iodoform used sparingly on the skin, on the third day only, will meet all needs.

No antiseptic or disinfectant other than cyanide gauze should be used at the time of operation, and for two days after. Certainly no antiseptic should ever be introduced into the abdomen, as they do more harm than good, and hinder, if they do not prevent, natural processes of recovery.

INCISION.

As rapidity of conducting any operation for the relief of so grave a condition is essentially an item making for success, so then does the method of opening and closing the abdominal wound become important, and as the prevention of post-operative hernia, especially after drainage, is desirable, an account of a rapid method of procedure will not be out of place here. The incision through the skin should preferably be made in the shape of an elongated letter S, as it gives more room, and is at no part exactly over the cicatrix in the muscles. The muscles are penetrated by the "gridiron" method, *i.e.*, the external oblique is penetrated by separating its fibres parallel with their direction, and then penetrating the internal oblique and tranversalis muscles (conjoint muscles) by an opening at a right angle to that in the external oblique by separating their fibres parallel to their direction; the peritoneum is incised parallel with the opening in the external oblique.

The above details, although well known, are given as being necessary for lucidity in the directions for closing the abdomen, which is most important if post-operative hernia is to be avoided. It is as quick to open the abdomen by the "gridiron" method as by direct incision through the entire abdominal wall. It is, however, quicker and more secure to close the abdomen and arrange drainage tubes if the abdomen is opened by the "gridiron" method; so that the "gridiron" method is the best.

CLOSURE OF ABDOMEN.

When closing the wound proceed as follows, if one tube only be necessary, and that will be the tube into Douglas' pouch: then proceed to insert it at the lowest pole of the peritoneal wound. Close the peritoneum by interrupted fine chromic gut sutures (twenty day) throughout its length except at its lower pole (and leaving also the upper pole free if a second drainage tube is used on the inner aspect of the colon). Now bring the wound in the conjoint muscles together throughout its entire length completely, from its outer to its inner pole, *use no part of this wound for drainage* (except in the case where the conjoint muscles are opened at the lower pole of the wound in the external oblique, and not as is usual, *i.e.*, half way between its upper and lower poles).

Now make a small new opening through the conjoint muscles, quite in the angle of the lower pole of the opening in the external oblique, to take the drainage tube (repeat this near the upper pole of the external oblique wound if a second drainage tube is being used). We now have the peritoneal wound closed except at one or both ends, as the case may be, the original wound in the conjoint muscles entirely and securely closed (chromic gut, twenty day), and a drainage tube protruding from one small opening in the conjoint muscles at the lowest pole of the still open external oblique wound (a second tube, if used, at the upper pole, as the case may be). The wound in the external oblique is now closed, as was the peritoneal wound, and lastly the skin wound is closed round the tube or tubes.

The wound is dressed with cyanide gauze, alembroth wool, and bandaged, and the operation is complete. It is recommended by some that the inguinal opening made at the time of operation should be entirely closed, and that a new opening in the middle line should be made through the linea alba. With this I entirely disagree, because it interferes with the direct outflow from the peritoneal cavity under *postural* drainage, and the natural lavage of the diseased area by normal fresh serum passing over it. The right lateral posture of the patient is then impossible as there is no dependent outlet in the flank, and saline enemata cannot be so easily and conveniently given. The second abdominal incision through the parietal peritoneum and abdominal wall markedly increases shock and lessens the chances of recovery, besides not being as convenient as the inguinal wound for postural drainage.

POSTURAL DRAINAGE

The reclining or semi-erect posture (Fowler's position) of adults in bed after abdominal operations for conditions requiring drainage has for its object the gravitation of the peritoneal secretions away from the diaphragm, and the use of the natural tendency of all the pocculi of the peritoneal folds and reflexions to discharge their contents towards the pouch of Douglas.

The semi-prone reclining position of children advocated here by me has the same object in view, and also facilitates the administration of the much needed saline enemata.

Observations by myself on animals suffering from abdominal injuries involving the peritoneal cavity, and the ease and certainty with which they recover, almost convinces me that the proper position (for adults at anyrate) for all suppurative peritoneal cases is to be slung in the prone position by suitable apparatus, and so assume the position of animals—thus favouring in the highest degree perfect peritoneal drainage. The slung prone position need not be maintained for more than twenty-four hours at the outside. After that time the patient could assume the supine position with safety.

DRUGS.

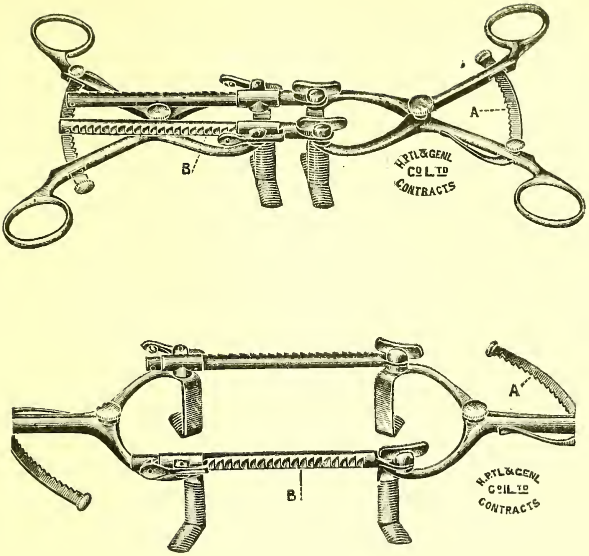
I would like to emphasize the great value of digitalis for children (and indeed for adults) suffering from peritonitic toxæmia of the heart. I can think of no condition of the heart in which digitalis is more signally useful. The digitoxin contained in the tincture appears to be the potent factor, as its slowing tendency, by prolongation of the diastole, as well as its increase of the force of the systole, seems to directly antagonize the toxic effects of the products of the bacterial flora of peritonitis which give rise to the very frequent "short, snappy beat" of the heart in this condition.

Children under or about five years of age stand two to two and a half minims of the tincture of digitalis with marked benefit. Strophanthus, in the same dose of tincture, has a distinctly useful place in combination with digitalis, inasmuch as it reinforces the heart beat without causing an increase of peripheral arterial tension, and possesses an extremely valuable property not hitherto noted, that is, that almost immediately after its ingestion it causes strong tonic contraction of the non-striped muscular fibres of the entire alimentary canal, thus tending to prevent distension of the stomach and intestines with gas, and in promoting the passage of flatus. Strophanthus is the most effective immediate peristaltant we possess as an aid in certain abdominal cardiac conditions.

Brandy repeated only so long as is needful in the saline enemata, and ammonia carbonate in half grain doses, with tincture of nux vomica in half to one minim doses in combination with digitalis and strophanthus, are all useful if used *secundum artem.* All milk should be peptonized for the first few days. As in adults, so in children, it appears that catarrh of the stomach and flatulent indigestion is not infrequent; it is found that convalescence is often hastened by the exhibition of a rhubarb, soda, and bismuth mixture, accompanied occasionally by a mild aperient, such as a teaspoonful of castor oil.

It is hoped that the foregoing practical hints, culled from actual practical experience in the successful treatment of septic general peritonitis in children in private practice, will prove useful and helpful to those who may be conscientiously desirous of doing their best under unaccustomed conditions, and who have a strong sense of the difficulties to be overcome in their endeavour to combat successfully a very fatal ailment.

21, NEW CAVENDISH STREET, W.
September 10th, 1912.



Adjustable Rack Retractor for Abdominal Incisions.

The instrument here illustrated is self-retaining and dispenses with many hands and retractors, as well as supplying the place of extra help when unobtainable.

A is the opening rack of the two double handles which carry the retention blades, and B is the extension racks which serve to keep the handles as far apart when opened as is desired by the operator.

Under B, the extension racks, the operator can at will insert a hand retractor and pull the whole incision to one or either side as desired. He can also fix gauze handkerchiefs or tetra sheets under B on either side of the wound in order to protect the wound edges and prevent contamination by the skin of any abdominal viscus withdrawn therefrom. This instrument has been found most useful in cases of appendicitis in children and in cases where the gridiron incision is used. It is also of service in gall bladder and epigastric operations.

The instrument is purposely made as light as possible, compatible with strength. The mechanism is such that it can be quickly inserted and opened to its full extent instantaneously, and it does not slip or twist round in the wound. The instrument provides ample room for the insertion of the hand and arm for exploration and for the withdrawal of almost any organ from the abdomen.

The instrument was carried out from my instructions by the Hospitals and General Contracts Company, Limited, of Mortimer Street, London, W.